THE NATIONAL GEOGRAPHIC MAGAZINE

Vol. XIII MARCH, 1902 No. 3

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THE NATIONAL GEOGRAPHIC MAGAZINE

THE POSSIBILITIES OF ALASKA

BY C. C. GEORGESON, OF SITKA, ALASKA

SPECIAL AGENT OF U. S. DEPARTMENT OF AGRICULTURE IN CHARGE OF ALASKA INVESTIGATIONS

HE would have been considered a rash prophet who five years ago had the temerity to predict that Alaska would one day become a great and powerful state.

Yet, today, such a prediction would not be ascribed to prophetic sight, but simply a common-sense view, a foregone conclusion, based on the resources and possibilities inherent in the territory. The change of opinion is due to the fact that it has been demonstrated that Alaska has agricultural possibilities of a high order. The development of agriculture will enhance the value of the other vast and varied resources of the territory a thousand fold. It will make it possible to work the extensive placer mines not rich enough in gold to pay at the present prices for foodstuffs, as well as the enormous deposits of low-grade quartz ores found nearly everywhere in the mountains.

Alaska has been maligned, abused, and totally misunderstood. It has been regarded as a frozen, worthless waste, whose only value consisted in its seal fisheries, and totally incapable of furnishing homes for a civilized people. These ideas are still current even in quarters where one would naturally expect to find a knowledge of the facts. Through the instrumentality of Secretary Seward, Alaska was purchased from Russia in 1867, for the sum of $7,200,000. It has already paid for itself many times over, and still we have scarcely begun to realize how enormous the resources are. What the profits to the lessees of the sealing privilege have been will probably never be made known, but it is interesting to note that the rentals received or due the government for the lease of this privilege from 1870 to 1895 amounted to almost the original cost of the territory, namely, $7,192,540.41 (Senate Document No. 81, 54th Congress, 2d session); and as to the income from mines, it is commonly reported that more than an equal sum has been taken from a single mine near Juneau, to say nothing of the millions taken out in other places.

Alaska has an area of 591,000 square miles, in round numbers; that is to say, it is as large as all of the United States

east of the Mississippi River, exclusive of the four states of Florida, Georgia, Alabama, and Mississippi. It requires an effort of the mind to grasp the significance of such an expanse of territory. There never could be a greater misconception in regard to a geographical fact than the popular idea that it is a snow-covered, inhospitable waste, and it is strange that this idea should be so persistently propagated and disseminated among the people. As a matter of fact, you can travel from one end of the Yukon to the other in summer time and never see snow. You see, on the contrary, a tangle of luxuriant vegetation, large forests, and such delicacies as wild raspberries, red currants, huckleberries, and cranberries in profusion. In places the grass grows as high as a man's shoulder. At Holy Cross Mission I desired to photograph some cattle, native born, reared by the fathers, and for that purpose asked that they be turned into a meadow reserved for hay. To my astonishment I found that the cattle were totally out of sight when they got into the grass, which reached above their backs.

Alaskan tourists are largely responsible for the false conception which is abroad in regard to the agricultural possibilities of the country. The high mountain range which skirts the sea coast is covered with snow and glaciers. It has a rugged, forbidding aspect. People who go as far north as Skagway and back again to Seattle in a two weeks' trip fondly imagine that they are studying Alaska, and that they are quite prepared to pass judgment on the whole territory, when, as a matter of fact, they have not been within 200 miles of the 141st meridian, where Alaska proper begins. To get anything like a correct idea of Alaska, one must go inside.

WHAT EXPERIMENT HAS PROVED

Facts ought to carry greater weight than theories founded on misconception. Now the facts are that all the hardy vegetables are grown with marked success all over Alaska south of the Arctic Circle, except on the coast of Bering Sea. I have never seen finer potatoes, cauliflower, cabbage, kale, peas, lettuce, and radishes than have been grown at the experiment stations at Sitka and Kenai. At Dawson I have seen a magnificent display of native-grown vegetables comprising all the hardy kinds; and at the Chamber of Commerce rooms of that town are displayed fine samples of barley, oats, and wheat in many varieties, perfectly normal in all particulars, and grown there by a local experimenter. At Eagle I have seen all the foregoing crops, and in addition a luxuriant growth of sweet peas, poppies, mignonette, and a host of other flowers in full bloom. At Holy Cross Mission I ate new potatoes, cauliflower, cabbage, carrots, beets, lettuce, and radishes in the beginning of August, all produced in the Mission gardens. At Rampart, in latitude 65, a station was established by the Department of Agriculture in the summer of 1900. Winter rye, seeded there in August of that year, lived through the winter perfectly under a good covering of snow. Although the temperature fell to 70° below zero, it came out in the spring in perfect condition, and matured grain by the first of August, 1901. Barley seeded in May of the latter year was ripe by the middle of August. At the headquarters station at Sitka I have for three years past grown as fine spring wheat as one would wish to see (samples of it may be seen at the Department of Agriculture), and barley and oats have been grown there successfully for four years. These grains have likewise been grown successfully at the experiment station at Kenai, on the Kenai Peninsula. This station is situated in a region where there are thousands of square miles of land available for farming and grazing. Captain W. R. Abercrombie,

who constructed the trans-Alaskan military road, at my request seeded the past summer small quantities of wheat, barley, and oats at Copper Center, in the Copper River Valley, and he writes me that they all matured. Ripe oats were seen last September by Mr. Isaac Jones, an employee of the Department of Agriculture, on a tributary to the Forty-mile, in about latitude 64. Two Wisconsin men, Messrs. H. C. Nicolai and D. H. Clark, started to farm at Skagway two years ago. In September of last year I saw considerable fields of oats, potatoes, and cabbage grown by them. On Admiralty Island, near Killisnoo, a man named Thomas Baker has been growing vegetables and grains for years with noted success. Small patches of grain have been matured at Kadiak, at Afognak, at the Moravian Mission on the Kuskokwim River, and at many other places. At Fort Selkirk an American named Frank Bach, and at Dawson two brothers named Morgan, also Americans, have secured from the Canadian Government tracts of upward of a hundred acres of land each, which they are farming successfully.

STOCK-RAISING

Cattle are kept at every considerable settlement in Alaska, except perhaps at Nome. They all do well. The treeless region to the westward of Sitka is especially well suited to cattle and all kinds of live stock. The Alaska Commercial Company has kept cattle, sheep, and Angora goats at Kodiak for many years, and they required but little feed and shelter, except in an occasional storm during winter. The data on these experiments were published in the report to Congress on the Alaska Investigations for 1899. The natives at Kenai and Ninilchik, on Cook Inlet, have kept cattle for half a century or more. At the latter place they have upward of thirty head. But few breeding cattle have as yet found their way into the interior, but horses are quite numerous there. In this connection it is of interest to note that in spite of the extremely cold winters in the interior, there are many instances on record in which horses abandoned by prospectors in the fall have survived the winters and come out in the spring in fair condition. Mr. Mark E. Bray, an American miner, told me last summer that he used five mules in his mining operations on one of the tributaries of the Tanana. He abandoned them when he went out in the fall, it being too expensive to buy feed for them in Dawson, where he wintered. When he returned to the diggings the following April he found four of them alive and well; the fifth had been killed by the Indians. In the fall of 1899 Mr. Jack Dalton turned loose forty-five head of pack horses he had used in carrying provisions over the Dalton trail, and in the spring of 1900 he found forty-three of them alive and well and in fair condition.

AGRICULTURAL LANDS

There are extensive areas of grass land in many parts of the interior. Mr. Isaac Jones, already referred to, made a reconnaissance last summer between Eagle, on the Yukon, and Valdes, on Prince William Sound. The distance between these two points as the trail runs is about 435 miles. He examined some fifteen miles on either side of the trail, thus covering an area of thirty miles wide by 435 miles long. Within the boundaries of this strip he estimates that he saw two million acres of pasture and farming land. In the region occupied by the Kechumstuk Indians, north of the Tanana, and especially along the south fork of the Forty-mile, he reports that he crossed a meadow with the grass waist high for a distance of eight miles. He also learned of horses which had run at large for two

years in this region. The Kechumstuk Indians have given a new name to cattle. They call them "McKinley moose," and Americans were known to them as "McKinley men." The chief of the village had secured an American flag, which he hoisted on a tall pole whenever he learned that white men were in his territory. There is some hope for the civilization of a tribe which cherishes such sentiments. Mr. Jones' description of the country is highly interesting. It forms part of my report now before Congress.

WHAT IT MEANS

The development of agriculture in Alaska means the settlement and development of the territory. It means the making of homes, a permanent population, the rapid development of the mineral resources, the creation of wealth, the building of a state. If, on the other hand, no foodstuffs can be produced in Alaska, a large population is impossible, and it could never become a state. We cannot imagine the possibility of sustaining even one hundred thousand people there if all that they required to support life must be brought from the states, a thousand miles distant, and carried hundreds of miles more from the ports of entry to the mining camps and villages in the interior. Under such conditions development of the natural resources must languish. Agriculture is the backbone of prosperity. An adequate food supply is the first essential to the growth of population, to prosperity, to greatness, and if this factor were lacking in Alaska, it would be doomed to remain a scantily populated territory. States with little or no agriculture make no growth. Look at Nevada, for instance. But it is fortunate for Alaska, and therefore for the whole country, for the growth of any section benefits the whole, that she has agricultural possibilities to an extent which will make the fullest development of her resources practicable. Alaska can furnish homesteads of 320 acres each to 200,000 families. She has abundant resources to support a population of at least three million people. Such a population would mean a volume of trade which would yield an immense and permanent income to the coast states. There are people who fear that the development of agriculture would prejudice the mining interests. Nothing could be further from the truth. On the contrary, it would be of the greatest possible help to the mining industry. It would reduce the cost of living, make labor more plentiful, and therefore cheaper, and give rise to better transportation facilities. It would then become possible to work the low-grade mines with profit, and to materially increase the profits of the good mines.

THE EXAMPLE OF FINLAND

The foregoing statements are borne out by the example of Finland. This little country lies wholly north of the 60th parallel. Alaska reaches six degrees south of this latitude. Finland is less than one-fourth the size of Alaska, and its agricultural area is less than 50,000 square miles; yet in 1898 Finland had a population of over 2,600,000 souls. Agriculture is the chief industry. Only about 300,000 people are city dwellers. They export large quantities of dairy products, live stock, flax, hemp, and considerable grain, and the population has increased some 825,000 in the last twenty-eight years, and this in spite of a very considerable emigration. The conditions in Alaska from an agricultural standpoint are more favorable than those of Finland. We have a larger agricultural area, somewhat warmer summers, and the mines will yield the best possible home market. When the fishing industry of Alaska

is developed, it will engage the labors of hundreds of thousands of people, who must be fed in large measure from the farms. Alaska has a coast line of 26,000 miles, practically all of which affords splendid fishing ground. The salmon is as yet the only fish which has attracted attention. There are thousands of square miles of cod banks, the enormous halibut grounds have not been touched, and the myriad shoals of herring go by unheeded. An oil and guano factory has been established for some years at Killisnoo, a little village some distance from Sitka, in which the herring is utilized. There is room for fifty such enterprises. The guano sells readily for $30 per ton.

WHY ALASKA IS NOT SETTLED

With such facts as to resources, why is Alaska not settled? Simply because settlers cannot get title to land. There is much inquiry for land, but when the would-be settler learns the status of affairs he changes his plans. To get title, the settler must first buy soldiers' additional homestead script, which can be located on unsurveyed lands. This will cost him anywhere from $5 to $15 an acre. Then he must deposit in the surveyor general's office an amount which will cover the cost of the survey. United States deputy surveyors charge $15 to $20 a day and traveling expenses in Alaska. He must also pay for the office work, entries, etc. The result of all this is that a piece of raw land in Alaska will cost him as much as a good, improved farm in almost any state. Such conditions are prohibitive, and Alaska will not be settled as long as they prevail. Again, a homestead of eighty acres, which the law allows, is not large enough. Stock-raising must, of necessity, become a leading branch in Alaska farming, and eighty-acre stock farms will scarcely be much in demand. Three hundred and twenty acres would be more in harmony with conditions which require considerable pasture land to make farming a success. Would it not be a wise policy to make the land absolutely free to *bona fide* settlers? The great expense necessary to reach the territory with work animals, implements, and all that is required for a start, and the hardships incident to pioneer life in a rigorous climate, far from civilization, entitle the pioneer to special consideration. The development of the territory depends upon his work. He must blaze the way and bear the brunt of the battle. His courage, endurance, and self-sacrifice constitute the very foundations on which the state must be reared. The exploitation of the territory's resources by wealthy corporations will not enrich or build the state. It is the pioneer, the settler, the home-maker, who, with ax and grubbing-hoe, subdues the wilderness and forces unwilling nature to yield him a livelihood; who nurtures a family; who rears the school-house and church. It is he who is the state builder, and every practicable means employed to aid him in the onerous task will further the development of the territory.

SARICHEF'S ATLAS, 1826

By Marcus Baker

In the year 1826 the Russian Hydrographic Office, then under the direction of Vice-Admiral Gavrila Andreevich Sarichef, published a large folio atlas of northwestern America, northeastern Asia, and the waters between. This atlas comprises 33 double-page sheets, of which 26 are charts and 7 are views. It appears to be a collection of charts made during the two or three decades preceding 1826, in which year they were collected together, numbered, and issued in atlas form. The first 6 are general charts and the remaining 20 special charts of various harbors, islands, etc. Some of these are copied from Vancouver, Kotzebue, and others, and some are from original surveys by Sarichef and others. Sarichef was one of the companions of Commodore Joseph Billings, who, by command of the Russian Empress Catherine II, conducted a secret astronomical expedition in and about Bering Sea in 1785 to 1794. The earliest Russian surveys about Unalaska, after Krenitzen and Levashef, 1768–1769, were made by Sarichef in or about 1790–1791.

Some of the separate charts, afterward brought together to form this atlas, are to be found in Washington in the Coast and Geodetic Survey Office, some in the Hydrographic Office, and perhaps some in private hands. No copy of the atlas, however, so far as I am aware, exists in Washington. Indeed, the only copy of it in the United States, so far as I know, is now owned by and in the possession of Professor George Davidson, of San Francisco. While I was engaged, in 1900–1901, in making a dictionary of Alaskan geographic names, Professor Davidson very kindly placed at my disposal his copy of this scarce atlas, a courtesy for which I here make grateful acknowledgment. Professor Davidson also permitted photographs of it to be made, and accordingly photographs were made of those sheets which specially relate to Alaska. One set of these photographs has been deposited in the Library of Congress, one in the Coast and Geodetic Survey, one in the U. S. Geological Survey, and one in the National Geographic Society.

On account of the rarity of this atlas and its importance for the history of Alaskan exploration and survey, it has seemed worth while to translate and publish a table of its contents. The atlas itself, Professor Davidson's copy, contains no table of contents, and it is therefore uncertain whether any was published. The following table is made up from the sheets themselves, the entries being translations of the titles engraved upon the sheets:

TABLE OF CONTENTS OF SARICHEF'S ATLAS, 1826

Title-page. Atlas of the northern part of the Pacific Ocean, compiled in sheets by the Imperial Navy Department from the latest information and maps, 1826, under the direction of Vice-Admiral and Hydrographer Sarichef I. Engraved and printed at the Hydrographic Office.

Sheet 1. Mercator's chart of the Pacific Ocean and part of the Arctic Ocean.

Sheet 2. Mercator's chart of the Okhotsk Sea and part of the Pacific Ocean, together with Kamchatka between latitude 46° 30′ and 62° 30′ north, longitude 104° and 144° 30′ [east] from St. Petersburg.

Sheet 3. Mercator's chart of the Pacific Ocean, with the Aleutian Islands and parts of northwestern America, from

latitude 47° 30′ to 62° 00′ north, longitude 141° 30′ to 179° 00′ east from St. Petersburg. Corrected from reports of Pilot Vasilief, obtained in 1829 on the coast of America from the Kuskokwim River to Fort Alexander.

Sheet 4. Mercator's chart of Bering Strait, with parts of the Pacific Ocean and Polar Sea from latitude 60° to 68° north, longitude 140° to 169° east from St. Petersburg.

Sheet 5. Mercator's chart of a part of the Pacific Ocean, together with northwest America between De Fuca Strait and Kenai Gulf (Cook Inlet), from latitude 48° to 62° north, longitude 174° to 209° east from St. Petersburg.

Sheet 6. Mercator's chart of a part of the Pacific Ocean, together with northwest America between the Bay of Panama and Fuca Strait from latitude 5° to 50° north, longitude 175° to 250° east from St. Petersburg.

Sheet 7. Mercator's chart of the Sandwich Islands from latitude 19° to 25° north, longitude 164° to 174° 50′ east from St. Petersburg.

Sheet 8. Mercator's chart of the New Philippines or Caroline Islands from latitude 5° to 30° north, longitude 106° to 144° east from St. Petersburg.

Sheet 9. Mercator's chart of the Japan and Yellow Seas, with parts of the Pacific Ocean, together with the coasts of China and Japan, from latitude 18° to 47° north, longitude 75° to 125° east from St. Petersburg.

Sheet 10. Contains four plans, as follows:

Northwest Corner.—Plan of the Port of Okhotsk and mouth of the Okhotsk River, with soundings in feet at low water. Drawn with the true compass from reports obtained in 1825. This port is in latitude 59° 20′ 38″ north and in longitude 216° 37′ west from Greenwich. Variation of compass, 1° 30′.

Southwest Corner.—Plan of Feklistof Island and a bay on the west side of it, with soundings expressed in sazhens (Russian fathoms). Compiled from information obtained in 1806 by Borisof, assistant pilot of the fourteenth class. Latitude of the island, 55° 20′ north, longitude 220° 20′ west from Greenwich.

Northeast Corner.—Chart of Aian Bay, situated on the Okhotsk coast west of the River Aldama, with soundings in sazhens. Compiled from information obtained in the year 1806 by Borisof, assistant pilot of the fourteenth class. The latitude of the bay is 56° 27′ 30″ north, longitude 221° 33′ west from Greenwich.

Southeast Corner.—Chart of the bay and of the mouth of the Aldoma River, which empties into it, with soundings expressed in feet. Compiled from information obtained in the year 1793 by Vice-Admiral Fomin. The latitude of the bay is 56° 50′ north, longitude 221° 12′ west from Greenwich.

Sheet 11. Chart of the Gulf of Avacha, together with the harbor of Saints Peter and Paul, which is in latitude 53° 00′ north, longitude 201° 15′ 30″ west from Greenwich. Compiled from information obtained in 1792 by Captain Sarichef. Soundings in sazhens.

This sheet has also a sub-sketch entitled:

"Plan of the harbor of Saints Peter and Paul, with the settlement indicated." Soundings in sazhens.

Sheet 12. Contains four plans, as follows:

Northwest Corner.—Chart of Mechigme Bay, situated at Bering Strait, in Chukotskoi Land. Mechigme settlement is in latitude 65° 27′ 30″ north, longitude 172° 18′ west from Greenwich. From the chart of Captain Billings, 1791. Soundings in sazhens.

Southwest Corner.—Chart of Akomten and Tekerki Bays, situated on the eastern coast of Kamchatka, at a distance of 38½ versts (about 25 miles) to the west of Avacha Bay. Latitude of the

bay, 52° 31′ north, longitude 201° 25′ west from Greenwich. Drawn up from reports of Geodesist Sergeant Hilef in 1789. Soundings in sazhens.

Northeast Corner.—Chart of St. Lawrence Bay, situated at Bering Strait, in Chukotski Land. Latitude of the anchoring place, 65° 39′ 33″ north, longitude 171° 11′ 35″ west from Greenwich. Soundings in sazhens. Taken from the chart of Lieutenant Kotzebue.

Southeast Corner.—Chart of Naashkin and Ipadin Bays, situated on the east coast of Kamchatka, at a distance of 28 versts (about 18 miles) to the west of Avacha Bay. Latitude of the bay, 52° 38′ north, longitude 201° 25′ west from Greenwich. Compiled from reports of Geodesist Sergeant Hilef, 1789. Soundings in sazhens.

Sheet 13. Contains four plans, as follows:

Northwest Corner.—Chart of Korovinski Bay, situated on the northwestern coast of Atka Island, in latitude 52° 25′ north, longitude 174° 10′ west from Greenwich. From the chart of Vasilief.

[Scale, 1¾ nautical miles to 1 inch, or 1 : 127000.]

Southwest Corner.—Chart of Attu Island, with indications of a harbor under the designation Ubiennoi (Massacre), which is situated in latitude 53° north, longitude 186° 40′ west from Greenwich. From the chart of Captain Golofnin.

[Scale, 3⅛ nautical miles to 1 inch, or 1 : 228000.]

Northeast Corner.—Chart of Tanaga Bay, situated on the western shore of Tanaga Island. Latitude of the anchoring place, 51° 52′ north, longitude 178° west from Greenwich. Variation of the compass, 16° 34′ east. Soundings in sazhens. From the chart of Sarichef.

[Scale, $\frac{13}{16}$ nautical mile to 1 inch, or 1 : 59000.]

Southeast Corner.—Chart of Massacre Harbor, situated on the southeastern coast of Attu Island, in latitude 53° north, longitude 186° 40′ west from Greenwich. Soundings in sazhens. Variation of the compass, 10° 45′ east. From the chart of Bieliaef.

[Scale, 0.46 nautical mile to 1 inch, or 1 : 33000.]

Sheet 14. Chart of the Aleutian Island Unalaska, together with the bays contained in it, with soundings in sazhens; also anchoring places. From the reports and compilations of Fleet Captain Sarichef in the year 1792.

[Scale, 2 nautical miles to 1 inch, or 1 : 146000.]

Sheet 15. Contains four plans, as follows:

Northwest Corner.—Plan of Chernofski Bay, situated in the western part of Unalaska Island, in latitude 53° 29′ north, longitude 167° 23′ west from Greenwich. Drawn from information by Fleet Captain Sarichef in 1792. Soundings in sazhens.

[Scale, 280 sazhens to 1 inch, or 1 : 23500.]

Southwest Corner.—Plan of Kuliliak Bay, situated in the western part of Unalaska Island, in latitude 53° 31′ north, longitude 166° 57′ west from Greenwich. Made from information obtained by Fleet Captain Sarichef in 1792. Soundings in sazhens.

[Scale, 175 sazhens to 1 inch, or 1 : 14700.]

Northeast Corner.—Plan of Captain Harbor, situated in the northern part of Unalaska Island, with adjacent places east and west, as well as the anchoring place and settlement of Iliuliuk, of which the latitude is 53° 55′ north, longitude 166° 43′ west from Greenwich. Variation of the compass, 19° 24′ east. Drawn from the chart of Lieutenant Kotzebue.

[Scale, 1⅙ nautical miles to one inch, or 1 : 85000.]

Southeast Corner.—Plan of Udagak Strait, between Unalaska and Spirkin Islands. The cape at eastern Beaver Village is in latitude 52° 58′ north, lon-

gitude 166° 29′ west from Greenwich. Drawn from information obtained by Fleet Captain Sarichef in 1792. Soundings in sazhens.

[Scale, 0.97 nautical mile to 1 inch, or 1 : 71000.]

Sheet 16. Chart of Chiniatski Bay, situated in the Island of Kadiak, with the entrance to Paul Harbor and the settlement of the Russian American Company, of which the latitude is 57° 47′ 10″ north, longitude 152° 18′ 18″ west from Greenwich. Soundings in sazhens. Compiled from reports obtained in the years 1808, 1809, and 1810 by naval officers formerly stationed there.

[Scale, 7/8 nautical mile to 1 inch, or 1 : 64000.]

This chart has a sub-sketch of St. Paul Harbor entitled :

"Plan of Paul Harbor and the Russian American Company's settlement, situated upon it, on the Island of Kadiak."

[Scale, 60 sazhens to 1 inch, or 1 : 5000].

Sheet 17. Contains four plans (and a sub-sketch), as follows :

Northwest Corner.—Chart of Port Chatham, situated in the entrance to Kenai Gulf (Cook Inlet), on the northwestern shore of America. Roadstead, in latitude 59° 14′ 00″ north, longitude 151° 40′ west from Greenwich. Variation of the compass, 24° east. Soundings in sazhens. From the chart of Vancouver.

[Scale, 1 5/16 nautical mile to 1 inch, or 1 : 68000.]

Southwest Corner.—Chart of the northwestern part of the Island of Khatagaluk and Nuchek Gulf, situated in latitude 60° 17½′ north, longitude 147° 00′ west from Greenwich. Variation of the compass, 28° 7½′ east. Soundings in sazhens. From the chart of Captain Sarichef.

[Scale, 1 2/3 nautical miles to 1 inch, or 1 : 122000.]

Northeast Corner.—Chart of the entrance to Three Saints Harbor, situated in the southeastern part of Kadiak Island. Its latitude is 57° 5′ north, longitude 153° 27′ west from Greenwich. Variation of the compass, 26° east. Soundings in sazhens. From the chart of Captain Sarichef.

[Scale, 7/8 nautical mile to 1 inch, or 1 : 64000.]

Southeast Corner.—Chart of Samganuda Bay, situated in the northeastern part of Unalaska Island. Its latitude is 53° 57′ north, longitude 166° 32′ west from Greenwich. Variation of the compass, 19° east. Soundings in sazhens. From the chart of Captain Sarichef.

[Scale, 7/30 nautical mile to 1 inch, or 1 : 17000.]

Sheet 18. Contains four plans, as follows:

Northwest Corner.—Chart of the entrance to Port Altorp, in Cross Strait, called by the English Cross Sound, situated in the northern part of Yakobi Island, on the coast of northwestern America. Roadstead's latitude is 58° 12′ 00″ north, longitude 136° 25′ west from Greenwich. Variation of the compass, 30° east. From Vancouver chart.

[Scale, 11/30 nautical mile to 1 inch, or 1 : 27000.]

Southwest Corner.—Chart of Altua Bay, situated on the coast of northwest America. Place under the letter A is in latitude 58° 37′ north, longitude 137° 31′ west from Greenwich. Variation of the compass, 25° east. Soundings in sazhens. From the chart of La Perouse.

[Scale, 5/6 nautical mile to 1 inch, or 1 : 61000.]

Northeast Corner.—Chart of Ilin Bay, situated in Yakobi Island, near Sitka Island. Place A is in latitude 57° 47′ 2″ north, longitude 136° 16′ west from Greenwich. Variation of the compass, 22° east. Soundings in sazhens. From the chart of Pilot Ilin.

[Scale, 7/36 nautical mile to 1 inch, or 1 : 14000.]

Southeast Corner.—Chart of Port Chal-

mer, situated in the northwestern part of Tsukli Island. Latitude of point A is 60° 15′ 00″ north, longitude 147° 28′ 30″ west from Greenwich. Variation of the compass, 28° 30′ east. Soundings in sazhens. From the chart of Vancouver.

[Scale, $\frac{1}{119}$ nautical mile to 1 inch, or 1 : 61000.]

Sheet 19. Chart of Sitka Bay, situated on the northwest coast of America, with indication of the entrance to the chief settlement of the Russian-American Company, called New Archangel, of which the geographical latitude is 57° 3′ north, longitude 135° 18′ west from Greenwich. Soundings expressed in sazhens. Establishment, 12:30. Rise of water, from 14 to 14½ feet. Compiled from reports obtained by naval officers in 1809.

[Scale, $\frac{3}{4}$ nautical mile to 1 inch, or 1 : 55000.]

Sheet 20. Contains four plans, as follows :

Northwest Corner.—Plan of Stewart Bay, situated on the northwest coast of America. Latitude of point A, 55° 38′ 15″ north, longitude 131° 47′ west from Greenwich. Variation of the compass, 28° 30′ east. Soundings in sazhens. From the chart of Vancouver.

[Scale, $\frac{1}{119}$ nautical mile to 1 inch, or 1 : 61000.]

Southwest Corner.—Plan of Protection Bay, situated on the northwest coast of America, in Beaver Island. Latitude of Point Baker, 56° 20′ 30″ north, longitude 133° 37′ 30″ west from Greenwich. Variation of the compass, 26° 30′ east. Soundings in sazhens. From the chart of Vancouver.

[Scale, $\frac{32}{35}$ nautical mile to 1 inch, or 1 : 67000.]

Northeast Corner.—Plan of Conclusion Bay, situated at the south point of Sitka Island, on the shore of Northwest America. Latitude of point A is 56° 15′ 00″ north, longitude 134° 40′ west from Greenwich. Variation of the compass, 25° 30′ east. Soundings in sazhens. From the chart of Vancouver.

[Scale, $\frac{6}{119}$ nautical mile to 1 inch, or 1 : 23000.]

Southeast Corner.—Plan of Spaskoi Harbor, situated on the northeastern shore of Yakobi Island. Its latitude is 58° 6′ north, longitude 135° 17′ west from Greenwich. Soundings in sazhens. From the chart of Assistant Pilot Bubnof.

[Scale, $\frac{1}{14}$ nautical mile to 1 inch, or 1 : 5200.]

Sheet 21. Contains four plans, as follows :

Northwest Corner.—Plan of Gray's Harbor, situated on the northwest coast of America. Latitude of point A, 47° 00′ north, longitude 123° 53′ west from Greenwich. Variation of the compass, 18° east. Soundings in sazhens. From the chart of Vancouver.

Southwest Corner.—Chart of Nootka Sound and Bay, situated in Vancouver Island, on the northwest coast of America. Soundings in sazhens. Latitude of point A, 49° 36′ north, longitude 126° 24′ west from Greenwich. Variation of the compass, 17° 49′ east. From the chart of Cook.

Northeast Corner.—Chart of Juan De Fuca Strait and Discovery Harbor, situated in northwest America. Latitude of point A 48° 2′ 30″ north, longitude 122° 37′ 30″ west from Greenwich. Variation of the compass, 21° 30′ east. Soundings in sazhens. From the chart of Vancouver.

Southeast Corner.—Chart of entrance to Bucareli Harbor, situated in Beaver Island on the northwest coast of America. In latitude 55° 15′ north, longitude 133° 35′ west from Greenwich. Soundings in sazhens. From the chart of La Perouse.

Sheet 22. Contains four plans, as follows :

Northwest Corner.—Plan of San Diego Harbor on the shore of northwest America. Latitude of point A, 32° 42′ 30″

north, longitude 117° 1′ 37½″ west from Greenwich. Variation of the compass, 11° east. Soundings in sazhens. From the chart of Vancouver.

Southwest Corner.—Plan of Port San Francisco, situated on the shore of northwest America, northern California. Cape Korolei, in latitude 37° 59′ north, longitude 122° 34′ west from Greenwich. Soundings in sazhens. From the chart of La Perouse.

Northeast Corner.—Plan of Monterey Bay, situated on the coast of northwest America, in northern California, in latitude 36° 38′ north, longitude 121° 34′ west from Greenwich. Soundings in sazhens. From the chart of La Perouse.

Southeast Corner.—Chart of the entrance to Columbia River, on the shore of northwest America. Point A, in latitude 46° 19′ north, longitude 123° 54′ west, from Greenwich. Soundings in sazhens. From the chart of Vancouver.

Sheet 23. Contains three plans, as follows:

Northwest Corner.—Chart of Socoro Island, to the south of Cape California. Latitude of Tent Settlement, on Socoro Island, is 18° 42′ north, longitude 110° 3½′ west from Greenwich. Variation of the compass, 7° east. Soundings in sazhens. From the chart of Arrowsmith.

Southwest Corner.—Chart of strait in Chugach Gulf (Prince William Sound), in the northwestern part of Klikaklik Island, with indications of the anchoring places. Compiled from reports obtained in the year 1790 by Captain Sarichef. Soundings in sazhens. Latitude of point A, 59° 56′ north, longitude 148° 24′ west from Greenwich.

Eastern Half.—Chart of a part of the shore of northwest America from Fort Rose to Big Bodega Cape, with Count Rumiantsof Bay. Latitude of anchoring place, 38° 18′ 30″ north, longitude 122° 35′ west from Greenwich. Soundings in sazhens at low water. Variation of the compass, 16° east. From the chart of Captain Hagenmeister.

Sheet 24. Contains three plans, as follows:

Western Half.—Chart of Manila Bay, in Luzon Island, situated on the border of the Philippine Islands. Latitude of Manila City, 14° 36′ 00″ north, longitude 239° 2′ 22″ west from Greenwich. Soundings in sazhens. From a Spanish chart made in 1792.

Northeast Corner.—Chart of Maribelski Harbor, situated on the border of the Philippine Islands, in Luzon Island, at the entrance to Manila Bay, on the northern side. Latitude of Maribel Village, 14° 26′ 15″ north, longitude 239° 31′ 30″ west, from Greenwich. Soundings in sazhens. From a Spanish chart made in 1792,

Southeast Corner.—Chart of Cavite Harbor, situated within Manila Bay. Latitude of eastern corner of the fort, 14° 29′ 20″ north, longitude 239° 5′ 40″ west from Greenwich. Soundings in sazhens. From a Spanish chart made in 1792.

Sheet 25. Contains three plans, as follows:

Northwest Corner.—Chart of Kastri Bay (De Castries), situated on the western coast of Tartary, in latitude 51° 29′ north, longitude 218° 57′ west from Greenwich. Soundings in sazhens. From the atlas made by La Perouse.

Southwest Corner.—Chart of Inner Harbor and Macao Roads, situated on the coast of China, of which the latitude is 22° 11′ 20″ north, longitude 246° 29′ west from Greenwich. Soundings in sazhens. From the chart of Arrowsmith.

Eastern Half.—Chart of the Chinese coast from Morskoi Gulf, or Ti-po-hoi, to Tikam Island. Soundings in sazhens. From the chart of Arrowsmith, published in 1812.

Sheet 26. Contains four plans, as follows:

Northwest Corner.—Chart of Brotonof Harbor, situated in the northern part of the chain of the Kurile Islands, of

which the latitude is 47° 8′ north, longitude 208° 2′ 30″ west from Greenwich. Soundings in sazhens. From the chart of Golofnin.

Southwest Corner.—Chart of the eastern part of Yesso Island from Nosteki Bay to Atkis Bay, of which the latitude is 43° 25′ north, longitude 214° 17′ west from Greenwich. From the chart of Krusenstern.

Northeast Corner.—Chart of a harbor in the eastern part of the Kurile Island Urupa, in latitude 45° 56′ 29″ north, longitude 209° 45′ 37″ west from Greenwich. Soundings in sazhens. From the chart of Captain Golofnin.

Southeast Corner.—Chart of Nangasaki Bay, situated in Kiuziu, one of the Japanese Islands. Latitude of Megaski, 32° 44′ 50″ north, longitude 230° 7′ 20″ west from Greenwich. Variation of the compass, 1° 45′ 30″ west. Soundings in sazhens. From the chart of Captain Krusenstern.

Sheets 27–33. Entitled, "View of the shores and islands situated in Okhotsk Sea and in parts of the Pacific Ocean."

MAGNETIC SURVEY OF THE UNITED STATES*

BY DR. L. A. BAUER, CHIEF OF DIVISION OF TERRESTRIAL MAGNETISM, COAST AND GEODETIC SURVEY

IN the "Plan for the Reorganization of the Survey of the Coast, as adopted by a board convened on the 30th of March, 1843, by direction of the President of the United States," explicit provision is made for the making of "all such magnetic observations as circumstances and the state of the annual appropriations may allow." Since then Congress, by more or less generous appropriations, has distinctly recognized the importance of this feature of the work of the Survey.

Under the first Superintendent, Prof. F. R. Hassler, the magnetic declination ("variation") was supplied on the Coast Survey Charts, as determined with the aid of the ordinary nautical instrumental means then in vogue.

The real magnetic work of the Survey, however, may be said to have commenced with Professor Hassler's successor, Prof. Alexander Dallas Bache. Professor Bache had previously made a magnetic survey of Pennsylvania, which was not followed until in quite recent years by the magnetic surveys of Missouri, New Jersey, Maryland, and North Carolina. He had likewise established the first magnetic observatory in this country—that at Girard College, Philadelphia—and, while on a trip abroad, had made a series of magnetic observations at various places.

Improved magnetic instruments were now imported, and the expert aid of Dr. John Locke, of Cincinnati, and Professor Renwick, of Columbia College, was temporarily employed. The three magnetic elements—declination, dip, and intensity—were determined at various places, chiefly along the sea coast.

The work of magnetic observation, thus fairly started, has since been prosecuted without interruption over the entire country, including Alaska and the Hawaiian Islands, as well as in some

*Abstract of an address before National Geographic Society January 24, 1902.

foreign countries, by various members of the Survey.

With the advancing years the demands for practical information from surveyors and mariners became so heavy that on July 1, 1899, there was created a special division, known as the "Division of Terrestrial Magnetism."

The magnetic work has thus been made one of the fundamental divisions of the work of the Survey, and it is now possible to undertake seriously a magnetic survey of the United States and countries under its jurisdiction according to the methods in use in similar undertakings abroad. Nearly every civilized country is at present either planning or has already carried out a detailed magnetic survey of its dominions.

OBJECTS OF A MAGNETIC SURVEY

A magnetic needle or compass does not point "true to the Pole," as the old saying would have it, and as was discovered by Columbus on September 13, 1492, but instead makes an angle with the true north and south line, this angle being anything you please, according to the location of the place where the compass is mounted. Thus, in the United States, in the extreme northeastern part of Maine, a compass points 21 degrees west of north, while in the northwestern part of the state of Washington it points 23 degrees east of north; hence a change of 44 degrees from one end of our country to the other. There are portions of the earth where the "north" end of the needle points due east or due west, and even for a place between the magnetic North Pole and the geographical North Pole due south.

In view then of the fact of the use of the compass by the surveyor to locate land surveys, by the mariner to guide him in storm and night, over trackless seas, and by the traveler to pilot him in unfrequented regions of the earth, it becomes the first object of magnetic surveys to determine the amount by which the compass direction differs from the true direction, and to publish the quantities in such a form so that those interested may, at a glance, be able to extract the desired information. The chart of lines of equal magnetic declination in the United States for 1900, based on over 4,000 determinations in different parts of the country, is a specimen of the form now generally adopted for giving this information in a convenient form. At the places along any one line, *e. g.*, the line marked 8 degrees east, passing through about the central part of the United States, the needle everywhere points 8 degrees east. Along the line marked zero, passing near Columbus, Ohio, and Columbia, South Carolina, the compass direction coincides with the true direction and the needle is "true to the Pole," etc.

Next, attention is called to the fact that such a chart can only apply to a certain year—thus our present chart is for January 1, 1900—namely, not only does the needle not generally point due north, as already shown, but the amount of the angle by which it departs therefrom is continually undergoing change, during the day, during the month, and from year to year. Thus, at London, for example, the needle changed its direction from 11¼ degrees east in 1580 to 24 degrees 12 minutes west in 1812, a change of 35 degrees in 232 years. A street a mile long, laid out in London during the year 1580, in the direction of the compass at that time, would have its northerly terminus by seven-tenths of a mile too far east, according to the compass direction of 1812. At the present time the needle points about 16½ degrees west at London.

In this country the rate of change in the compass direction is not as large as at London, but nevertheless of sufficient magnitude to seriously affect the magnetic bearings of boundary lines. Thus, at Baltimore the needle pointed in 1670 about 6 degrees and 6 minutes west; in

1802, 39 minutes west, and in 1900, 5 degrees west. A street laid out in Baltimore in 1670 so as to run parallel to the compass direction prevailing at that time would have its north terminus one-tenth of a mile too far west in 1802.

This change in the compass direction, known as its *secular change*, was discovered by Gellibrand, an English mathematician, in 1634.

Even in the course of a day the fitful needle changes its direction by an amount sufficient to be taken into account. This amount, according to the season of the year, may cause a discrepancy of from 5 to 20 feet at the terminus of a line a mile long run by the compass in the morning and re-run in the afternoon.

Again, at times the needle's direction, by some subtle force, is abruptly changed out of its course. This is the case during magnetic storms which make their influence felt over a very large portion of the globe at practically the same instant of time. Thus, in November, 1882, during the period of maximum number of sun spots, occurred a magnetic storm which caused the needle at Los Angeles, California, to change its direction by more than a degree and a third. At the same time General Greely, at Lady Franklin Bay, in the Arctic region, noted a deflection of 20 degrees and 48 minutes. Frequently these magnetic storms are accompanied by brilliant displays of polar lights.

There are, in addition, many minor fluctuations, depending upon the position of the sun and the moon with reference to the earth and to each other.

We can follow with our eyes the sun in its apparent motion around the earth, and can behold many of the manifold changes ever taking place in our starry firmament, but here is something in the earth, invisible to us, that we call magnetism, which day by day, year in, year out, passes through its cycle of changes—a force powerful enough to bend every bit of magnetized steel out of its regular course and to compel the needle to march in perfect obedience to its will!

We thus see that it is possible to portray the state of the earth's magnetic condition, as represented by magnetic maps, only for a definite moment of time. The tides, the trade winds, while subject to definite periodic fluctuations, nevertheless will not change their general character for thousands of years, but a few years suffice to materially change and make useless a cartographical representation of the magnetic lines.

The second great object of a magnetic survey must, therefore, be to provide such means, in order that a continuous record be obtained of the countless fluctuations and vagaries of the magnetic needle. It is then possible to always bring our magnetic charts up to date, and to provide the surveyor and mariner with the precise amount of change between any two given dates.

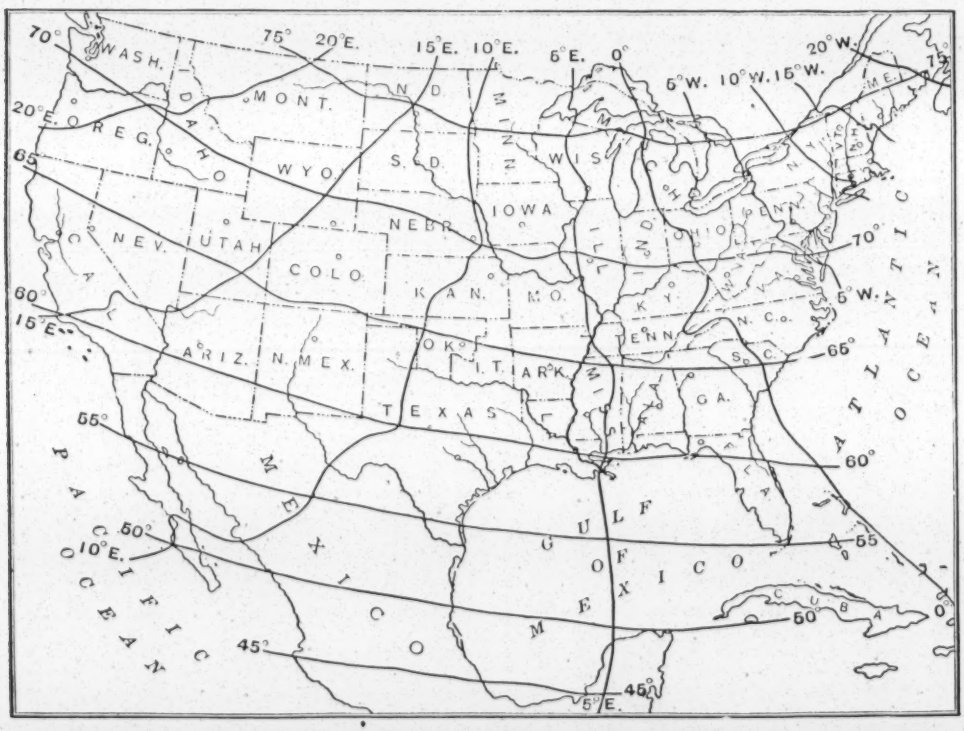
The Coast and Geodetic Survey has made an exhaustive and careful compilation of all the available data for the past three centuries as obtained from various sources, and the practical information which it is in the position to furnish in reference to inquiries from lawyer and surveyor is regarded as final and authoritative throughout the country. The amount of money saved to land-owners in the prevention of costly litigations by the information thus furnished exceeds many times the total amount spent by the government for magnetic work.

Furthermore, in connection with the magnetic survey, certain base stations are established, where are erected magnetic observatories, in which are mounted sensitive magnetic instruments, recording photographically, day and night, the variations or changes of the magnetic needle. Such a station has been established 16 miles southeast of the city of Washington, at Cheltenham, Maryland, far removed from artificial disturbing influences, such as elec-

tric car lines, whose powerful influence may affect magnetic instruments five miles away. Similar stations have also been established at Baldwin, near Lawrence, Kansas; at Sitka, Alaska, and near Honolulu, in the Hawaiian Islands, in order to assist in the magnetic survey of those regions. All of these observatories are furthermore taking part in the international magnetic work conducted in coöperation with the present Arctic and Antarctic Expeditions.

The practical application of magnetic data is, however, not entirely limited to a knowledge of the direction of the compass needle. The mariner, with the modern iron ship now in use, carries with him a continuous source of disturbance, so that his uncompensated compass will fail to give even the true magnetic direction for the ship's position. It is therefore necessary to apply such counteracting or correcting devices which will annul to a large extent the ship's magnetic influence. These mechanical devices are not, however, entirely compensatory for all the places a ship is likely to be in, owing to the changing character of the ship's own magnetism, and so the mariner must determine a table of correction (the so-called deviation table) for the different positions and directions of the ship's head. For this purpose a knowledge of the dip of the magnetic needle (the angle by which a magnetic needle mounted in the vertical plane passing through the magnetic meridian is pulled down by the earth's magnetic force) and the intensity of the magnetic force are essential. The electrician, the geologist, and the physicist likewise desire a knowledge of these quantities. They are furthermore essential in ascertaining the precise laws underlying the variations of the earth's magnetism.

A complete magnetic survey, therefore, embraces the determinations of the three magnetic elements, magnetic declination (variation of the compass), dip, and intensity, and their changes from time to time.



Lines of Equal Magnetic Declination (Variation of the Compass) and Equal Magnetic Dip for the Year 1900

SVEN HEDIN IN TIBET

MR. JOHN B. JACKSON, Secretary of the United States Embassy at Berlin, sends to this Magazine an abstract of a letter from Sven Hedin to King Oscar of Sweden, describing Sven Hedin's march across Tibet. The letter is dated at Leh, India, December 20, 1901, and was received at Stockholm late in January of this year. During the last three years that he has been in Asia, Sven Hedin has explored and mapped six thousand miles of territory previously unknown to civilization. He has taken over 4,000 photographs and sketches. This expedition, in its results, is the most important he has ever made, and marks him as one of the most dauntless, accurate, and original explorers of history. Before the publication of the more scientific results of his journey he will write a large book for the public describing his travels. An account of his work during the first two years of the expedition appeared on page 393, volume xii, of this Magazine.

Dr. Sven Hedin left his headquarters in northern Tibet July 27, 1901, and, disguised as a Buryat and accompanied only by Lama, a Mongolian belonging to the caravan, also disguised as a Buryat, set out on his march to the south. They carried only absolute necessities, but when two days out were attacked by robbers and relieved of various articles besides their two best horses. This taught them the need of night watches, so they took turns in watching every night three hours at a time, which was a hardship, for it was the rainy season, and it poured. The further south they went the more wet it became, until at last the ground was little better than a deep morass, which threatened to engulf them. But they worked through, and at last reached inhabited land, where the black tents of the nomads greeted them and the rich grass promised fine feed for their cattle. Lama was able to communicate with these nomads, and was shown the way toward Lhasa.

They went on for two hard days' marches, when one evening they were suddenly halted by some native chiefs. Three soldiers appeared before their tents and informed them shortly that they were to consider themselves prisoners and forbidden to attempt to escape under penalty of death. They were very well treated, however. Everything they required was supplied, but they were kept in ignorance of what was to become of them pending the arrival of the "banbo," the governor of the province, who had been notified of their capture, and who would on his arrival decide what was to be done with them. Meanwhile their anxiety was increased by the departure of a large force, fully armed, back on the track, and they feared that an attack on their headquarters was contemplated. Finally the banbo arrived, and word was sent to Hedin that he would receive him. To this Hedin replied that he had no special desire to see him, but that if his excellency desired to meet him he was always to be found in his tent! The result was that the governor, accompanied by 67 chiefs and courier soldiers, appeared at his tent, gorgeously apparelled. They informed Hedin that he was known to be an Englishman, and that it was impossible to allow him to proceed to Lhasa. He was also informed that they were aware that he had a large caravan in the north, which was attempting to enter his province of Nokktgin, and accordingly all northern entrances were strongly guarded. The banbo then gave Hedin presents of horses, sheep, etc., and returned him to the border as a prisoner of war under guard of 20 soldiers.

They reached their caravan on the

28th of August, very thankful to have escaped so easily, and found all in good order. After necessary rest the whole caravan continued its way in a south-westerly direction, determined to keep on their course until stopped again by the Tibetans. This happened in a short time, on the east side of the Naaksang-Tfo Lake, where an embassy from Lhasa stopped them. It was 300 riders strong, heavily armed with guns, swords, and pikes. He asked them what would happen if in spite of their command he insisted on pushing to the south. "We will fire upon the caravan," was the steady reply. He attempted to make it clear to the good people that each of his forces could easily dispose of at least 36 Tibetans, and that their fire would be of no great danger to them. The chief considered on this argument that it would be as well for both parties to attempt to come to some understanding without shooting. Hedin then continued on the march in a westerly direction, being accompanied in good-fellowship by the Tibetan guard. Near Tyargutso the troops were augmented by 500 riders, and it was not for several weeks that they became convinced that Hedin and his party did not intend to profane their holy city, and the stately cavalcade left them to pursue their way alone to Panggong and Leh, where they arrived in good condition on the morning of the 20th of December, 1901.

AMERICAN PROGRESS IN HABANA

THE city of Habana has so long been considered as a sort of nursery of diseases for the United States that the average American citizen finds it hard to realize that today Habana is clear and pure, more healthy than Washington and many cities on the American continent. Unenviable has been the record of the Cuban capital; yellow fever, typhoid fever, and filth diseases have found a luxurious home there for one hundred years. In 1896 1,262 deaths from yellow fever alone were reported by the city government. In 1899, the year of least yellow fever during eleven years, 1889–1899, 101 persons died in Habana with the dreaded pest. The average for the eleven years was 440 fatal cases. In 1901, for the first time in the history of the city, the yellow fever season—April 1 to January 1—has passed with only five fatal cases of the disease occurring. October, November, and December, 1901, the months during which the fever was wont to play the fastest, each came and went without a single case.

The wise, conscientious, persistent measures which for three years the United States officers have been enforcing throughout Habana, despite the opposition and dislike of the Cubans, have delivered the city of its old foes—filth and filth diseases.

The illustrations that accompany this brief paper show strikingly the contrast between Habana of the past and Habana of today. The pictures were loaned to this Magazine by Major Wm. M. Black, of the Engineer Corps of the U. S. Army. On the United States occupation of Habana, January, 1899, to Major Black was given charge of the engineering work of the city, and to him are due in large measure the splendid results that have been achieved. His courageous and broad-minded enthusiasm overcame prejudice and opposition and found inexpensive methods of accomplishing tasks which were thought impracticable because of their supposed cost.

By the end of the second year of American occupation every house in

No. 1. Cleaning Houses on Officios Street, Habana

the city had been cleaned from top to bottom at least once under the supervision of American officers. Picture No. 1 shows the cleaning squad in front of a house which was about to be attacked. The squad washed the floors with electrozone (made by the electrolysis of sea water) and the walls with a solution of bichloride of mercury. As many as 16,000 houses were cleaned in this way in a single month. When the squad left a house it was as clean and spotless as "Spotless Town." All this cleansing was done by hired Cubans under the personal direction of an American officer. The Cuban of high or low degree had to have his house purified, and his remonstrances availed nothing. It may at first sight seem to have been an arbitrary course of proceedings, to enter a man's house thus and wash it while he and his family looked on, but the health and safety of the whole people demanded that a complete cleansing of the city be made. The sights that met the cleaning squad may be imagined but not described. Accumulations of years and decades of filth were heaped in cellars and courts and closets.

The cleaning of the houses, however, was not a circumstance to the work of opening and cleaning the sewers. These had not been touched since they were built, long ago. Years of refuse had choked many of them, so that the system had become a continual source of danger to the city. Without hesitation, however, they were attacked by the energetic squads and every foot of sewer thoroughly cleansed and repaired. So scientifically was the work done that, though the men were working deep down in the ground all day long, not a single man of the squads was taken sick.

No. 2. Hospital Militar, Habana

No. 3. Before American Occupation

The wretched shanties on the left were breeding dens of disease

No. 4. After American Occupation

The shanties have been cleared away

No. 5. A Section of the Colon Park, Habana, when the United States Officers Assumed Control of the City

When the United States troops entered Habana the building shown in picture No. 2, though intended for a hospital, was notorious as probably the most vile building hygienically in the world. Between 60 and 70 per cent of the patients carried there died within its walls. Even the American doctors shunned the place, and soldiers passing literally held their breath. The first thing the American officers did was to cleanse it from top to bottom; then they put several thick coats of whitewash on its walls, and made the building, which is as large as two city blocks, as spick and span as a Yankee kitchen. The hospital is now used as a school-house for 700 children. The top floor has been remodeled into school-rooms, and furnished throughout with the latest American improvements. A gymnasium, with a complete equipment, was added, and the basement turned into a warehouse. Today there is not a healthier spot in Habana than this building, which for years had been a hot-house of vice and disease.

The hovels on the left, in picture No. 3, were formerly breeding dens of disease. They had been built on public parking by some investor who had bribed the Spanish officials to overlook his appropriation of public property. The miserable huts were crowded with the refuse of humanity, and the investor and disease had reaped equally rich harvests. One of the first things the new administration did was to tear down the row. Picture No. 4 shows the transformation. The high wall on the left is a part of the old city wall, of which only this small section remains.

No. 6. The Same Section of the Colon Park a Few Months Later

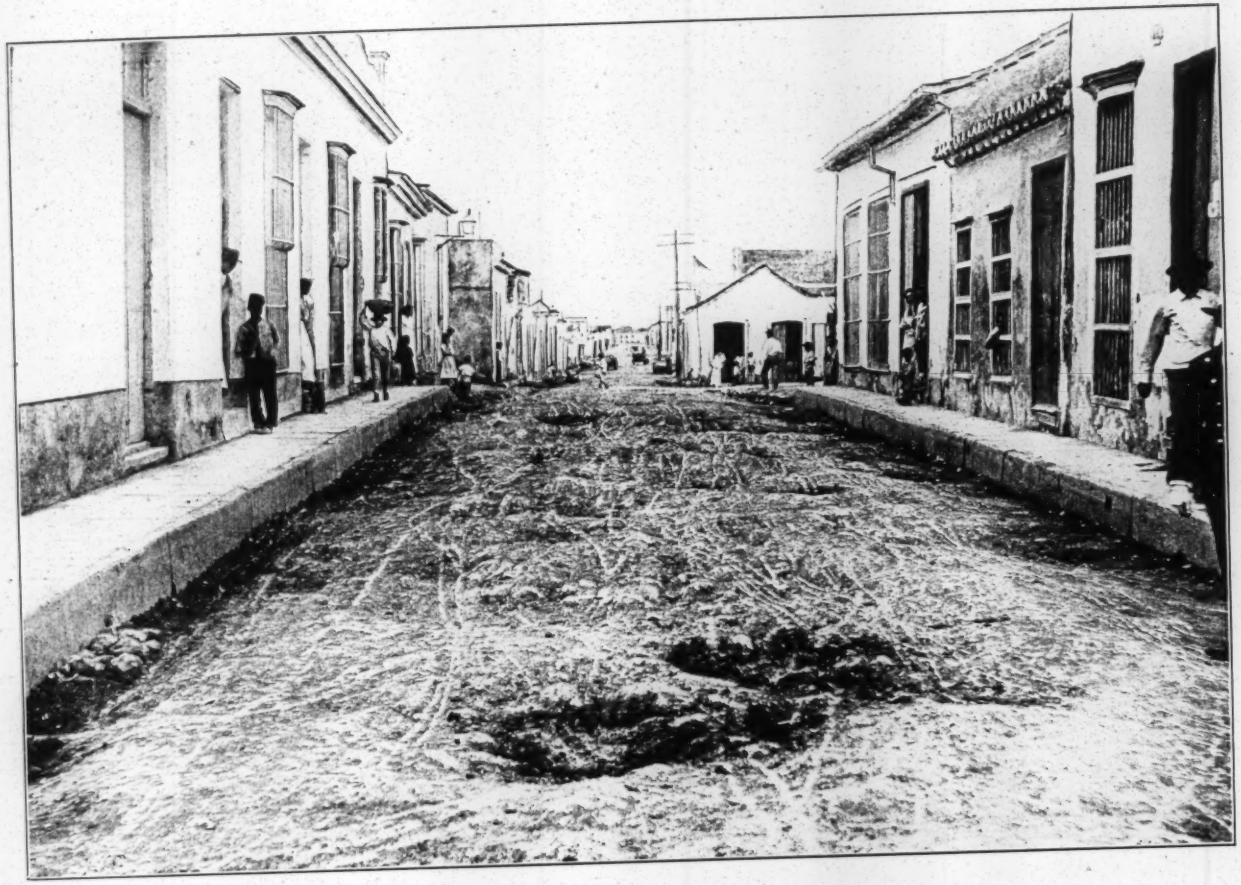
The parking inside the wall belongs to the people.

The former condition of Colon Park is shown by picture No. 5. The park had run to weeds and coarse grass. It was not only unattractive because of its general untidiness, b 't quite unsafe for women and children. At night-time it was haunted by thieves and thugs. To pass by after dark was to risk being held up and robbed of one's purse or even of one's clothes.

Today the park is one of the pleasure spots of Habana. Children and nurse girls throng the walks in the daytime. In the evening it is a popular promenade for the people. The walks have been cleaned, the grass and trees trimmed, new trees and shrubs planted, benches have been placed under the trees, and at night-time electric lamps keep the park bright and safe.

Picture No. 7 represents a typical street of Habana in 1898. This street was then regarded as quite a good one. Picture No. 8 shows the same street after the American officers had been in the city a few months. The holes and stones have disappeared and in their stead is a hard, smooth, well-drained way. One hundred and twelve miles of streets in Habana and its suburbs have undergone this transformation. The width of the streets ranges from 4.4 meters to 13 meters.

The engineers had a problem on their hands to remake such narrow thoroughfares without blocking the traffic, but they solved the problem, and the work progressed rapidly without interruption to the stream of carts and vehicles. During the repairing of one street, which was only 4.4 meters wide, between the hours of 6 a. m. and 6 p. m. Major



No. 7. A Street in Habana Before United States Occupation

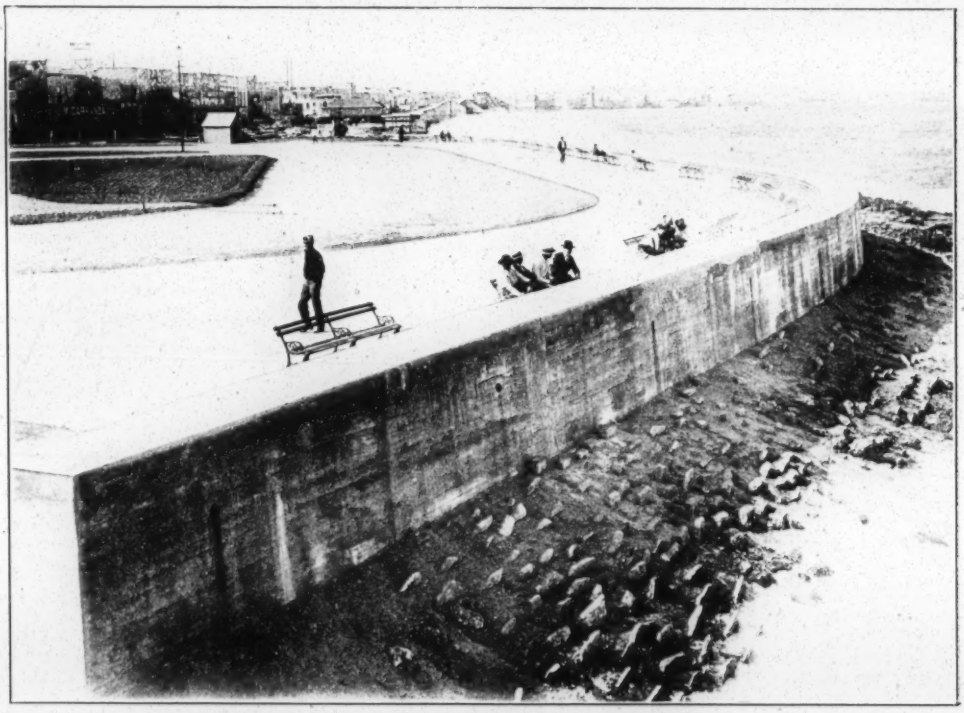
No. 8. The Same Street After Twelve Months of United States Occupation

Black counted 2,371 vehicles passing one point; during the busiest part of the day 324 passed in a single hour. On another street, 6 meters wide, 2,500 vehicles passed a certain point in one working day.

The streets were washed as thoroughly as the houses, 33,000 gallons of electrozone often being used in one day for this purpose. This electrozone proved very effective, and is a comparatively new idea in street cleaning. It had been used in New York previously with partial success. Major Black heard of it and succeeded in introducing it into Cuba. Electrozone costs very little, as it is made by the electrolysis of sea water by the cheap process discovered by an American several years ago. Two strengths were used: one, of a very strong quality, for a disinfectant, and the other, of a weak quality, for a deodorizer.

The magnificent sea wall and promenade shown in picture No. 9 was built under Major Black's personal direction. The promenade is placed at the end of the Prado, the wide avenue which is a favorite drive of the inhabitants. Formerly the beach was the dumping ground of everything offensive to the nose and eye. The stones in front of the wall are designed to break the force of the surf. When the plan of building this wall was announced a great outcry arose about American extravagance, and the government was charged with scheming to squander a quarter of a million dollars of the people's money.

As a matter of fact, the wall cost about $10,000. Its cheapness has been a wonder to the citizens of the town,



No. 9. The Sea Wall Built at the End of the Prado Promenade by Major Black

No. 10. Cleaning the Barracks

who are accustomed to generations of officials careless of the course of public funds. It is now planned to continue the wall some distance further. Thousands of people come here for their daily promenade to watch the breaking of the great waves and enjoy the fresh breezes from the sea.

It should be remembered that every dollar spent for the improvements of the capital and elsewhere in the island of Cuba has come from the pockets of the Cubans, and not one cent from the United States.

The Cubans have not liked the process which has made them cleaner and healthier. If they could have voted on it, probably they would have vetoed to a man the house and street cleaning proposition. What was good enough for their fathers and grandfathers was quite good enough for them. But now that the parks have been made enjoyable and sea promenades built where they can loaf at ease and in safety, they begin to take pride in the improvements to their capital.

The reputation of the city of Habana is rapidly changing for the better. The beautiful surroundings which Nature has given it and the mildness of its climate in winter make the city a Paradise to northerners during the harsh season of the year. There are many who believe that Palm Beach and the winter resorts of Florida are many times eclipsed by the charms of the Cuban capital, and that in the near future it will rightly become the most popular of American winter resorts.

CUBAN RAILWAYS

By ALBERT G. ROBINSON

CUBA was no laggard in the adoption of steam railways as a means of transportation. I have not at hand the date of the opening of the first Cuban railway, a 43-mile line from Habana to Guines, but it came within a few years of the opening of the first American line. Following a concession granted by Governor General Tacon in 1837, the Puerto Principe and Nuevitas line was opened in 1851. The Matanzas-Sabanilla road was opened in 1854. Others followed until, at the time of the American occupation, on January 1, 1899, Cuba could boast of 124 railroads, with a total length of 2,100 miles, representing a valuation of $70,000,000.

The Puerto Principe-Nuevitas system deserves a passing note for its peculiarity. Its capital is $1,000,000, represented by eight shares, though no printed stock certificates have ever been issued. It is practically a private corporation. Three stockholders are elected annually to serve as a director, a treasurer, and a secretary. They serve without pay and are not eligible for reelection. The road has neither mortgage nor outstanding indebtedness. Its expenses are paid from its receipts. For the fiscal year ending June 30, 1900, its earnings were $292,442.42. Its operating expenses were $191,120.33, leaving $124,312.88, which was paid as dividends to its eight stockholders.

The number of Cuban railways (124) seems out of proportion to the mileage until it is understood that only 17 are public lines. The remaining 107 are private roads for the transportation of sugar-cane in the vicinity of the large *centrales*, or grinding mills. The 17 public lines cover 1,135 miles. Of this all except 162 miles are in the western

half of the island. The system of the eastern half is represented by four short lines running to interior points from the ports of Santiago, Guantanamo, Gibara, and Nuevitas, and by a Spanish military road across the island, along the line of the Jucaro-Moron trocha. This was constructed with the expectation that it would enable the Spanish army to limit insurgent activities to the region of their inception—the provinces of Santiago and Puerto Principe.

Much the larger part of the Cuban railway system is now in the hands of English companies. English capital was represented prior to the insurrection, and its holdings have been largely increased during recent years, notably about the time of the American occupation. Purchases were made at prices which American investors did not care to touch, in view of the condition of the properties and the uncertainty of those prompt returns which are a much more important item in the mind of the American investor than they are in the mind of his English competitor in the world of finance. The principal systems, five in number, represent about nine-elevenths of all the public lines. These are under English control, though some American money is represented among the stockholders.

The private roads are practically feeders to the public lines, though some run to coast ports. Thus the United Fruit Company operates 29 miles of railway, with 7 locomotives and 300 cars. This runs from the company's plantations to the shipping port of Banes. The Terry estate operates some 65 miles of road, with 16 locomotives and 700 cars. Of the private lines which connect with the public lines, some use their own equipment and some use the equipment of the lines with which they connect. The 107 roads represent an investment of nearly $12,000,000.

At the close of the war many of these lines, both public and private, were in exceedingly bad condition as a result of the destructive methods employed by the contending parties. Equipment had been wrecked, stations burned, bridges and culverts blown up, and road-bed neglected. Travel over them meant so many hours of misery at exorbitant rates of fare. There has been a notable improvement in physical conditions, but the rates are still excessive. These average about 7 cents per mile for first-class passengers and about 5 cents per mile for second-class. On some runs I have paid as high as 12 cents per mile. Freight rates are also exorbitant, and a serious detriment to the welfare and the development of the country. Some effort is now being made to effect a modification of rates by military order, though the legality of the step is somewhat doubtful.

But the railway feature of the greatest importance in the island is the line which is now in process of construction by Sir William Van Horne and his associates of the Cuba Central Railway. This will connect at Santa Clara with the lines now running from Havana to Cienfuegos. It will extend eastward for a distance of some 350 miles, *via* Ciego de Avila, Puerto Principe, and Las Tunas, to the Bay of Nipe, on the northeastern coast, which will become a prominent port of shipment. Nipe is perhaps the best harbor on the whole Cuban coast line. This company has also purchased the short line now running northward from Santiago. This will be extended to the main line from Santa Clara to Nipe. With these lines completed, there will be railway connection from Santiago to Pinar del Rio, a distance of some 600 miles.

The benefits of this system are not to be estimated. It will open a vast area of fertile land for cultivation and settlement. The railway project is, in fact, little more than an incident in a great scheme of insular development. The road will tap, by means of radiating

lines, the country to north and south of its course. It will open for profitable cultivation an area of approximately 10,000,000 acres, or about one-third of the total acreage of the island, hitherto practically undeveloped. Along its route there will be sugar estates and cattle ranges. There will also be groves and orchards. Small farmers will grow vegetables and small fruits for our winter market.

Nipe Bay is but 60 hours distant from New York by such steamers as will one day run between the ports. Trains from inland points, connecting with these steamers, will bring us, for winter consumption, fresh vegetables, strawberries, and other small fruits grown under natural conditions and laid down in our eastern cities during the season when such a supply is most acceptable.

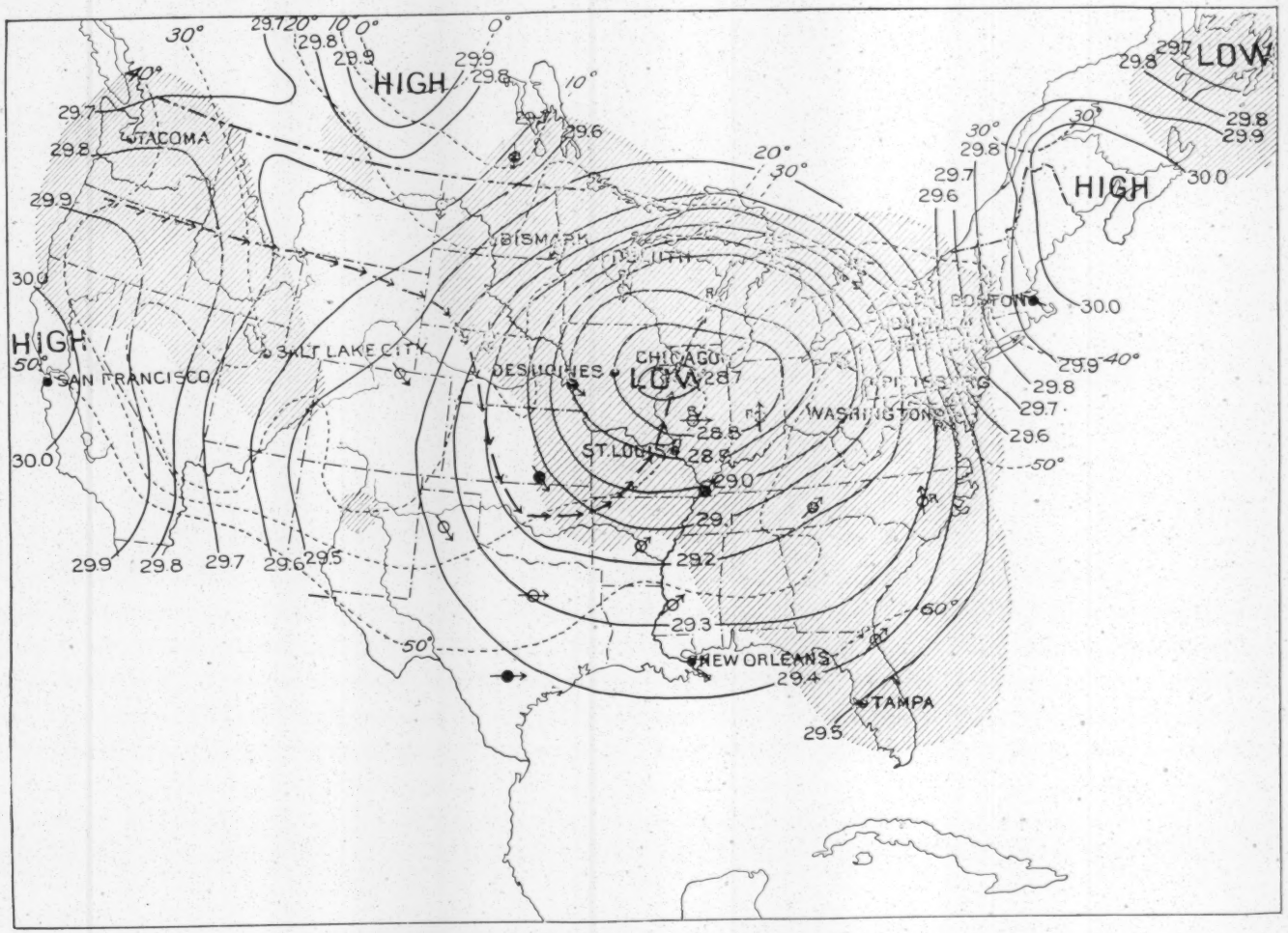
Cuba has yet to pass through a period of political stress and trial, and probably through a period of financial liquidation. Her political problems will be solved, probably at no distant day, by her absorption into the American Union. In the solution of her financial and industrial problems, the extension and development of her railway system will be an important, if not the determining, factor. Upon the ashes of her insurrection, and out of the throes of political reconstruction, there will come a new Cuba, a land of law and order, of peace and plenty. Cuba will become in fact as well as in name The Pearl of the Antilles.

THE STORM OF FEBRUARY 25-28, 1902

THE tempestuous weather of February, 1902, culminated in one of the most remarkable storms in the history of the Weather Service. The storm came direct from the Pacific, striking the Washington, Oregon, and California coasts almost simultaneously, early Tuesday morning, February 25, 1902. In the next 24 hours its front had pushed well across the Rocky Mountains, leaving a trail of rain from San Diego and the desert region of the Southwest to the northern boundary. Twelve hours later—that is, at 8 p. m., 75th meridian time—Wednesday, February 26, it had debouched over the dry plains east of the Rocky Mountains as a violent wind storm without precipitation. The winds at the storm center on Wednesday were relatively light—10 to 12 miles per hour—but around the periphery of the storm, in the southwest quadrant, especially, winds of 60 to 70 miles per hour prevailed.

The movement of the storm after leaving Oklahoma, where it was central Wednesday evening, was quite slow. It reached southwestern Missouri by 8 o'clock Thursday morning, and eastern Iowa by Friday morning at the same hour. Thence it moved slowly northeastward into the upper lake region, where it was last observed Saturday evening, March 1. The effect of the slow movement of the storm during and subsequently to the time of recurving in Oklahoma and Arkansas was to set the air east of the Rocky Mountains in motion around the storm center in a direction contrary to the movement of the hands of a watch. The weather map of Friday, February 28, 1902, illustrates the whirling of the air about a central point most beautifully, and at the same time presents the rather unique spectacle of the entire surface stratum of air, from the Rocky Mountains to the Atlantic, circling in a gigantic whirl about a single storm center. This circulation naturally produced striking contrasts in the weather experienced in widely separated parts of the

has occurred during the 12 hours preceding 8 a. m., 25th meridian time, February 28, 1902. The arrows point in the direction in which the wind is blowing.



Weather Map, 8 a. m., February 28, 1902

Solid lines are isobars; broken lines are isotherms. The shaded portion of the map indicates the area over which precipitation has occurred during the 12 hours preceding 8 a. m., 25th meridian time, February 28, 1902. The arrows point in the direction in which the wind is blowing.

country: high temperatures, thunderstorms, and torrential rains in the southern and southeastern quadrants; rain, hail, and snow in the northwestern and western quadrants. The high temperatures and heavy rains, coming as they did after a brief period of rainy weather, conspired to swell the rivers and small streams of the south and east to dangerous and destructive stages. The flood in the Ohio River at Pittsburg was equal to that of 1884, but fell short of the great flood in 1832 by about two and a half feet. The monetary loss in damage to property, loss of wages and earnings in the city of Pittsburg alone will aggregate $1,250,000.

The remarkably low barometric pressure, not only in the center of the storm (28.68 inches, Friday morning, at Davenport, Iowa), but from ocean to ocean, was doubtless due to the rapid movement of several areas of low pressure across the United States, each low being followed in turn by a second low before pressure had risen appreciably in the rear of the first.

ALFRED J. HENRY.

AGRICULTURE IN ALASKA

THE article in this number by Prof. C. C. Georgeson, special agent, Department of Agriculture, upon the agricultural possibilities of Alaska, will doubtless be read with much interest. It is an excellent presentation of the subject from an extremely optimistic point of view.

It is easy to understand how an agriculturist, meeting with success in a land which has always been considered a frozen, worthless waste, and who, through the employment of careful, scientific methods, is rewarded by the growth and maturity of cereals and vegetables, could become enthusiastic over the productivity of Alaskan soil and the possible results awaiting its cultivation. Professor Georgeson is sincere, but his error (for most scientists familiar with Alaska believe him to be in error) lies in the fact that his enthusiastic statements are in danger of leading the reader to believe that agriculture on a commercial scale is possible in Alaska.

While it is admittedly true that hardy grains and vegetables have been brought to maturity at various points on the coast and in the interior, the climate must always prevent this northwestern territory from becoming a successful farming region. To be successful, farm products must be grown at a less expense than they can be raised in California, Oregon, or Washington, plus the cost of transportation. We do not think that Professor Georgeson would maintain that farmers upon the Alaskan coast could compete in their home markets with the Pacific states. In the interior of Alaska, where climatic conditions are more favorable than upon the coast, the summers being hotter and less moist, and where home products would be protected by higher transportation rates, it may be possible to maintain successful competition, although that is a matter yet to be demonstrated.

HENRY GANNETT.

GEOGRAPHIC NOTES

DR. BELL'S SURVEY IN BAFFINLAND

"BAFFINLAND is a large island on the west side of Baffin Bay, or opposite to Greenland. It stretches from Hudson Strait northwestwards through twelve degrees of latitude, or from 61° 40′ to 74° north. It is the third largest island in the world, being only exceeded by Greenland and Australia. Its total length is 1,005 English statute miles, and its breadth varies from 200 to 500 miles, the average being 305. The area is therefore about 300,000 square miles, or about ten times that of Scotland or Ireland. It forms, however, only about one-tenth of the superficies of the Dominion of Canada. Notwithstanding its immense extent, it appears to be of no great value, since it is composed, as far as we know, of barren rocks, partly covered with ice." So writes Dr. Robert Bell, Director of the Geological Survey of Canada, in a summary account of work printed in the *Geographical Journal* for July, 1901. The survey occupied the summer of 1897, from July 20, when the *Diana* put off the survey party in a little yacht (with a year's supplies against emergency) on the stormy and tide-swept coast, until September 12, when they were taken up by the same vessel. The coast-line was found exceedingly complex and bordered by literal thousands of islands—*i. e.*, the country from North Bay nearly to Fox Channel is a deeply incised plateau, inclining westward, and half submerged beneath the waters of Hudson Strait. The interior is mainly bleak and barren, with scant herbage in places, a meager fauna, and an Eskimo population estimated at 670 for the whole of Baffinland. Much of the land is a permanent ice-field like interior Greenland, and glaciers of great extent feed bergs to the adjacent seas; while in the comparatively ice-free interior there are several great lakes, hundreds of lakelets, and many rivers. Dr. Bell discovered Lake Amadjuak, about 120 miles long and 40 miles broad, at an altitude of about 290 feet, and, through Eskimo accounts, located the still larger Lake Nettelling at a somewhat lower level; while the coast surveys located a number of safe harbors. The local nomenclature applied by Dr. Bell is a monument to contemporary geography and geology; the National Geographic Society Board is perpetuated by McGee Lake, Gannett Lake, Gilbert Lake, Merriam Lake, Hyde Lake, and Greely Lake; Powell Lake, Winchell Lake, Walcott Lake, Stevenson Lake, Franz Boas Lake, Orton Lake, Emerson Lake, Bailey Island, Chamberlin Island, and Cape Salisbury commemorate well-known American geologists and geographers, and British geographers, geologists, and other personages are equally remembered, while McKinley Island and Hobart Island pay compliment to the neighboring nation; yet the old nomenclature, from Frobisher down, is retained for larger features, and the local Eskimo names are applied wherever known.

W J McGEE.

NOTABLE WORK ON ALASKA

MR. MARCUS BAKER is the author of an official geographic dictionary of Alaska just published by the U. S. Geological Survey. It consists of 450 pages packed with information, descriptive, geographic, and historical, on the Alaskan territory. The volume is a summary of almost every fact about Alaska which the American wants to know but does not know where to find. Mr. Baker has been working a number of years on this work. Ten years ago the Board of Geographic Names decided to prepare a geographic dictionary of Alaska, and appointed a committee con-

sisting of Mr. Herbert G. Ogden and Mr. Marcus Baker to conduct the work. Later the editorship devolved on Mr. Baker.

The introduction to the work explains the origin of Alaskan names. Naturally many of the names were bestowed by the Russians prior to the purchase of Alaska by the United States. A few of the names were given by Spanish explorers along the southern coast during the last quarter of the 18th century. Cook, Vancouver, Captain Beechey, and other Englishmen also named many capes and headlands. Americans did not begin bestowing names in Alaska until 1848, but since that time they have bestowed many hundreds. But, as Mr. Baker says, the most important are the names given by the natives, Eskimo and Indian.

Perhaps the most valuable feature of this very notable work is a list of the different exploring expeditions of Alaska, with a brief summary of the results of each expedition and references to the separate published reports. An idea of the patient and exact scholarship required to bring the work to such a successful termination may be obtained from the fact that over 7,000 names are included in the dictionary. The volume may be obtained from the Geological Survey for the nominal sum of 30 cents.

MOUNT ATHOS

IT is a firm belief of the Eastern monks that God will not allow a monastery to be burned. When the Russian monastery of Saint Pantelemon at Mount Athos was burned a few years ago, the Greeks, who constitute the great majority of the 6,000 monks on the peninsula, maintained that their Russian brethren had brought the calamity on themselves because they had fire-engines and extinguishers and did not trust wholly in God. Now the neighboring Greek monastery of Saint Paul, which had no fire-engines, has recently, together with all its treasures, been utterly destroyed by fire.

This was one of the more modern and less populous of the twenty monasteries which dot Mount Athos. It was erected in the 14th century and had less than 60 inmates. But its reliquary possessed many Byzantine objects of great interest, the more remarkable being a Byzantine model of Herod's temple and a silver cross, 3 feet 1 inch in length, covered with jewels and exquisite miniature portraits of the saints in enamel. The library consisted of about 120 manuscripts, the majority in Slavic and a few in Greek.

Most of the monks came from the Ionian Islands, and though those islands passed from the control of Great Britain in 1862, were commonly called "Englishmen" by their coreligionists. This is said to have been the only monastery at Mount Athos which has ever been visited by a woman. The wife of a British embassador landed from her yacht one day on its tiny pier and insisted on entering the church. In consequence the monks, relieving each other by relays, for 40 days and nights maintained a continuous service of prayer to purify the church from this contamination.

BUREAU OF FORESTRY

THE important work the Bureau of Forestry is doing in promoting interest in the welfare of the forests of the country and the large results obtained in 1901 are described by the Forester, Mr. Gifford Pinchot, in his last annual report. The Bureau is now giving practical assistance and advice in the management of 50,000,000 acres of national, state, and private forest lands, an area larger than the state of Nebraska. An efficient organization of trained men has been formed, whose *esprit de corps* and enthusiasm is most marked.

During the year 1901 38 private own-

ers applied to the Bureau for assistance in the care of their forest lands; these included lumber companies in Arkansas, Missouri, New York, and Maine, and Hon. William C. Whitney. In each case a working plan was made for the owner. An examination of the Black Hills Forest Reserve, where practical forestry is urgently needed, was made, and a working plan for the reserve is nearly ready. The Prescott, Big Horn, and Priest River forest reserves were also examined for the same purpose.

Mr. Pinchot announces that an extensive investigation of the forest conditions of Nebraska has been carried far enough to show that it is feasible to replant large areas hitherto believed to be permanently treeless. The forests of Texas have been carefully studied and will form the subject of an early special report. Many owners of unprofitable cleared or treeless lands have received assistance from the Bureau, and by replanting have made these lands of value.

The Bureau of Foresty is studying the native trees of the United States and Philippines that yield commercial tanbarks, resins, and gums. As many as 50 species are being tested in conjunction with the Bureau of Chemistry. Another investigation of the greatest importance aims to find the causes and prevention of decay of railroad ties and timber, and to discover what trees will produce railroad ties in the shortest time.

LOSS OF LIFE BY LIGHTNING

FROM 700 to 800 persons are killed annually in the United States from lightning strokes, is the estimate given by Prof. A. J. Henry in a bulletin on the subject recently published by the U. S. Weather Bureau. For some years the Weather Bureau has been seeking to ascertain the loss of life from this cause, and in 1900 received actual records of 713 fatal cases of lightning stroke. This number was obtained from the reports of the many officials of the Bureau throughout the country and from lightning cases cited in the newspapers, especially in the journals of the rural districts. During the two years of 1899–1900 as many as 30,000 clippings were received by the Bureau from one clipping agency, which shows that the lightning strokes were carefully watched. Of course, most of the clippings were duplicates, sometimes as many as 50 notices of the same case being received.

The loss of life from lightning is greatest in the Ohio Valley and the Middle Atlantic States, if we consider both unit area and density of population. If density of population only be considered, it is greatest in the Upper Missouri Valley and in the Middle Rocky Mountain region. Of the 713 fatal cases reported in 1900, 291 were killed in the open, 158 in houses, 57 under trees, and 56 in barns, and the circumstances attending the death of the remaining 151 are not known. During the same year nearly one thousand—973 persons—were more or less injured by lightning. The Weather Bureau has discontinued collecting statistics of loss of life by lightning. The experience of the past years has convinced it that the practical results of the enquiry do not justify the expenditure of time and money.

U. S. GEOLOGICAL SURVEY

RECENT publications by the U. S. Geological Survey include:

"Geology and Water Resources of Nez Perce County, Idaho." By Israel C. Russell. Professor Russell describes at considerable length the Columbia River Lava formation of Washington, Oregon, and western Idaho. This area produces annually from 50,000,000 to 60,000,000 bushels of wheat and large quantities of other grain. The fine, dark, rich soil, almost unrivaled in fertility, has resulted from the disintegration and decay of volcanic rocks which,

in a sea of lava, inundated the region in mid-Tertiary times. Further notice of this notable work will appear later in this Magazine.

"The Lead and Zinc Deposits of the Ozark Region," by H. F. Bain, with an introduction by C. R. Van Hise, and chapters on the physiography and geology, by George I. Adams. The Ozark region is an elliptical area, about 300 miles long by 200 miles wide, embracing the southern half of Missouri, the northern third of Kansas, and small adjacent portions of Illinois, Kansas, and Indian Territory. The region is rich in minerals of economic importance.

"The Asphalt and Bituminous Rock Deposits of the United States." By George H. Eldridge.

"The Gold Belt of the Blue Mountains of Oregon." By Waldemar Lindgren. Three-fourths of the gold output of the state is from the Blue Mountains. Within the last few years this region has resumed the prominent position among the gold-bearing areas which it held about forty years ago.

"Oil and Gas Fields of the Western Interior and Northern Texas Coal Measures," by George I. Adams.

"The Geology and Mineral Resources of the Copper River District, Alaska," by F. C. Schrader and A. C. Spencer.

"Geology and Water Resources of Yakima County, Washington," by G. O. Smith. These publications may be obtained for a nominal sum.

TREASURY BUREAU OF STATISTICS

EVERY bulletin and publication issued by this department contains information, usually unobtainable elsewhere, on some living topic of the day. Recent monographs include:

"The Danish West Indies," a summary of facts about the three little islands whose annexation to the United States is now imminent.

"Commercial Japan in 1900," a new edition of a monograph first published in December, 1901. The work includes a scholarly treatise on "The development of commerce in Japan, and its effect on civilization in that country," by Chohei Shirasu, A. M. (a native of Japan). It was by this treatise that Mr. Shirasu gained the degree of master of arts from Columbia.

"Great Canals of the World," condensed information and statistics in regard to all the great artificial waterways of the world—the Suez, Kaiser Wilhelm, Manchester, Canadian, St. Marys Falls, New York State, canals in India, Holland, Belgium, etc.

"Statistical Abstract of the United States." Solid columns of figures are not usually interesting, but the tables in this report are really picturesque. They are arranged in parallels in such a manner as to give a graphic picture of the gigantic leaps of the United States in every direction during the past century. This is a work that should be studied by every geographer, historian, teacher, or man of affairs in the United States.

ATLAS OF THE PHILIPPINES

SOME months ago the first Philippine Commission published, under the auspices of the U. S. Coast and Geodetic Survey, an atlas of the Philippines comprising some 30 colored maps of the different islands of the archipelago. The edition was, however, so small that very few were fortunate enough to secure a copy. General A. W. Greely has recently published a large second edition of this atlas under the auspices of the Signal Office, and responsible persons may obtain a copy by addressing the War Department. For many years the Jesuit Fathers of Manila had been preparing a series of maps of the more important islands. They were much handicapped by an absolute want of accurate surveys, but they secured all available data and

such information as they could get from other religious orders, the old residents and explorers. The first Philippine Commission decided to publish the series for want of anything better, and this was done under the editorship of Father Jose Algué, Director of the Manila Observatory. The maps necessarily are not so recent as the War Department map, which was published as a supplement to the January number of this Magazine.

Argentina-Chile Boundary.—The recent acute difficulties between Argentina and Chile have been temporarily settled. It will be remembered that the recent strained relations were caused by Chile's sending police into certain sections of the disputed territory, and also building roads at alleged strategic points in the territory. In the protocol signed by the two republics Chile declares definitely that the roads were opened merely in order to explore the country and to help the experts who were studying the boundary line, and that in no sense did the act of building the roads mean an occupation of the territory. The two republics furthermore agree to police jointly such sections as may need police regulations. About a year ago Argentine submitted to the British arbitration committee four quarto volumes of evidence and a large portfolio of maps in support of its claims. Chile has at last also submitted its final documents, and it is hoped a permanent decision of the boundary dispute will soon be reached.

Dr. Eugene Murray-Aaron, editor of Cram's Atlas, has recently compiled from latest surveys a bird's-eye view of the Maritime Canal and the Isthmus of Panama. It is an excellent piece of work and is published by George F. Cram (Chicago).

GEOGRAPHIC LITERATURE

Wandering in Three Continents. By the late Captain Sir Richard F. Burton. Edited by W. H. Wilkins, M. A. With illustrations. New York: Dodd, Mead & Co., 1901. $3.50 *net.*

The volume gives a fascinating account of the bold wanderings of this great traveler. Burton was the first European to enter Mecca and Medina disguised as one of the people, 1853; he penetrated Abyssinia in the days when it was as forbidden ground as Mecca; with Speke he discovered that vast inland African lake, Tanganyika, rumors of which had for centuries been whispered on the seacoast; he went on a dangerous mission as British envoy to the King of Dahomey, and was a guest of his wild court and protected by the army of Amazons; later he explored the interior of Brazil, and in 1870, while consul at Damascus, made an eventful trip to Palmyra. "Wandering in Three Continents" consists of eleven popular essays or lectures on these journeys. Burton wrote many heavy works of travel, but none of a popular form, so that this posthumous volume of popular essays is specially welcome. Five of the essays were read before the Emperor and Empress of Brazil while he was consul at Santos, and the others before distinguished gatherings in England and Scotland.

Cram's Atlas of the World, Ancient and Modern. New Census edition. Edited by George F. Cram, Dr. Eugene Murray-Aaron, I.C. Clare, and others. New York and Chicago: George F. Cram, 1901. $10.

For the general uses of the home or school this atlas is unequaled. The design of the editors has been to publish a volume that would answer the needs of the general reader and student, and to produce it at a moderate price. In ad-

dition to the many modern maps and admirable historical charts, the editors have included a series of statistical diagrams showing the world's distribution of population, of wheat, minerals, etc. There are also a number of astronomical maps and much interesting descriptive matter about the different countries, the progress of knowledge during the nineteenth century, etc. In the maps and matter relating to America the atlas excels. The editors have incorporated the latest data from the geographic and scientific bureaus of the United States Government. For instance, in the spelling of geographic names the rulings of the U. S. Board on Geographic Names have been followed. This latest edition of Cram's well-known atlas has been entirely rewritten, hundreds of new photographs have been added, all the maps reëngraved, and many new maps added. Dr. Murray-Aaron and his large staff of workers have made a splendid work. The one apparent defect is an omission of many of the routes of the great explorers in history. A series of maps outlining the main routes of discovery on land and ocean would add to the value of the atlas.

NATIONAL GEOGRAPHIC SOCIETY

PROCEEDINGS

MEETING OF THE SOCIETY:

February 7, 1902.—President Graham Bell in the chair.

Maj. William M. Black gave an address on "Some American Work in Cuba."

February 21.—Meeting postponed to March 7.

LECTURES:

February 14.—President Graham Bell in the chair.

Hon James Wilson, Secretary of Agriculture, and Prof. Joseph A. Holmes, State Geologist of North Carolina, gave addresses on "The Proposed Appalachian Forest Reserve." Both addresses will be published later.

February 28.—President Graham Bell in the chair.

Hon. E. F. McSweeney, Assistant Commissioner of Immigration, gave an illustrated address on "Fifty Years of Immigration," which will be published later.

ANNOUNCEMENTS

MEETINGS OF THE SOCIETY:

March 7.—"Notes on the Geography of Alaska." Alfred H. Brooks, U. S. Geological Survey.

"Petroleum Resources of the United States." Dr. C. Willard Hayes, U. S. Geological Survey.

March 21.—"Mt. Wrangell." Robert Dunn, of New York.

LECTURES:

March 12.*—"Problems of the Pacific—Japan." Prof. E. F. Fenollosa, University of Tokio, Japan.

March 14.—"American Progress in Cuba." Maj. William M. Black.

March 19.*—"Australia and New Zealand." Henry Demarest Lloyd, author of "Newest England," etc.

March 26.*—"The Pacific Basin." G. K. Gilbert.

March 28.—Subject to be announced. Mr. George Kennan.

April 2.*—"Hawaii, Guam, and Australasia." Dr. Charles H. Townsend, U. S. Fish Commission.

The following standing committees have been appointed by President Graham Bell. The President is an *ex officio* member of all committees:

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